

to let these new nations develop independently.

Although the Clinton administration has expressed concern about Russian pres-

Russian military intervention on the side of separatists in the breakaway Georgian province of Abkhazia, for instance, RUSSIA, Page 16

AP PHOTO

Guards at Moscow's White House check a car yesterday as top ministers moved into the former parliament building, three months after it was damaged by tank fire.

Doctors say radiation, image aside, is often beneficial

By Dolores Kong
GLOBE STAFF

The era of experiments

■ Fernald residents were used in tests of a blood pressure medication and the birth control pill's effect on acne. Page 14.

■ A state mental patient killed herself after being given LSD, a psychiatrist says. Page 14.

■ The CIA hunts for records of radiation research. Page 14.

In 1941, an MIT researcher used radioactive iodine to treat thyroid disease for the first time – and sparked the growth of what is now known as nuclear medicine. The advance, most physicians agree, revolutionized the treatment of patients with the disorder, often making surgery unnecessary.

Only a few years later, other Massachusetts Institute of Technology researchers began giving small amounts of radioactive calcium and iron to some mentally retarded boys at the Fernald State School as tracers to study digestion.

Although reports of the use of radioactive isotopes at Fernald in the 1940s and 1950s have gener-

ated concern among some about the use of radiation, many physicians see a great difference between using low doses of radioactive isotopes to treat or diagnose a patient, and using the substances to get answers to basic biological questions, especially without the informed consent of those in the study.

"This is another example of a problem that nuclear medicine has had since its inception – the things it is associated with," said Dr. Henry Wagner, a Johns Hopkins University professor who wrote a 1989 book, "Living with Radiation: The Risk, the Promise."

Although the Fernald studies also included the use of low levels of radioactive isotopes, those tests would not – then or now – be considered part of

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Doctors stress benefits of radiation

■ NUCLEAR

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nuclear medicine, physicians in the field say. The medical specialty, formalized 20 years ago, involves using isotopes to find out what is wrong with a patient and treat the problem, not to answer questions about such things as the digestive process, the specialists say. (An isotope is a variation of a chemical element that may or may not be radioactive.)

Nuclear medicine "benefits many, many people, and it has for many, many years," said Dr. S.T. Treves, chief of nuclear medicine at Children's Hospital in Boston. "Not all radiation is the same. Unfortunately, the public perception is that it is all the same."

The field has "improved lives and even saved lives in some circumstances," said Dr. Conrad Nagle, president of the 1,700-member American College of Nuclear Physicians and nuclear medicine chief at the William Beaumont Hospital in Troy, Mich. "Almost daily I see these benefits."

In addition to nuclear medicine, radiation is used by physicians in radiation oncology to treat cancer and in radiology to diagnose a medical problem through the use of X-rays, according to Nagle. Radioactive tracers today are also used by researchers in test tube or animal experiments or in humans with their full informed consent, he added.

Today, nuclear medicine can provide early evidence of whether malignancies, such as breast cancer, have spread to the bone, and can help determine whether a patient with chest pains requires heart bypass surgery, according to Nagle. These procedures usually call for the injection of low levels of such radioactive isotopes as technetium 99m or thallium, which disappear from the body in as little as three days.

In the case of breast cancer, for instance, "we can in nuclear medicine determine whether the cancer has spread to the bone sooner than [with] any other existing test, without harm to the woman," Nagle said.

Some who oppose nuclear technology say there is some harm from

The use of radiation

PAST PRACTICES

In the 1950s and 1960s, many people were routinely exposed to radiation in amounts and uses that are unacceptable today.

- Shoe stores used fluoroscopy machines to look at the bone structures of customers' feet. The fluoroscopy machine used an X-ray to provide a shadow projected onto a fluorescent screen. The X-ray would focus on the area as long as the fluoroscopy machine was projecting the image.
- Radiation was used to treat ringworm, acne, bursitis and birthmarks.
- In some cities, free chest X-rays were given for the diagnosis of tuberculosis.
- Voice teachers used fluoroscopy to show the position of a singer's diaphragm.
- Babies were given fluoroscopic exams as part of routine check-ups.
- Luminous radium dials were used in wristwatches and airplane instruments.

CURRENT DOSES

Advances in technology have decreased the exposure in treatments where benefits are thought to outweigh risks.

■ In the late 1950s, scientists developed a new radioactive isotope, technetium 99m (TC-99m), which stays in the body for approximately six hours. Iodine-131, which was used before the development of TC-99m, had a half-life of eight days.

■ The development of more sensitive X-ray films has decreased the amount of radiation used for X-rays. For example:

Mammography: In the early 1970s, patients were exposed to **4 to 5 rems** of radiation.

Now, patients are exposed to **.2 to .4 rems**.

Chest X-rays: In the 1950s, patients received about **1 rem** of radiation. Today, patients are exposed to **20 to 25 millirems**.

COMPILED BY MAUREEN GOGGIN

SOURCES: Dr. John W. Goffman; Catherine Caulfield, "Multiple Exposures: Chronicles of the Radiation Age"; Dr. Edward Webster, Massachusetts General Hospital; Dr. Charles Kelsey, University of New Mexico

GLOBE STAFF GRAPHIC

low levels of radiation that has yet to be determined.

Nagle, however, said that when the only alternatives are a radioactive screening test or the spread of a tumor, the choice is clear.

About 10 million Americans every year receive such nuclear medicine diagnostic procedures as heart scans and bone scans, Nagle said.

The average American is exposed to about 100 millirems of radiation a year from medical and dental procedures, and about 100 millirems a year from such natural sources as the Earth, the sun and other people, according to Nagle. (People naturally emit low levels of radiation, as a result of a potassium isotope.) In Boston, however, the average environmental exposure outside of medical and dental procedures is as high as 300 to 400 millirems, as a result of natural radiation emitted by building materials and other sources, said Treves of Children's Hospital.

Nuclear medicine still includes the use of radioactive iodine to treat thyroid disease, pioneered by MIT biologist Sol Hertz in 1941, using the isotopes made in the university's cyclotron, Wagner noted.

In addition to treating thyroid disease, nuclear medicine has been used to help burn victims or people with heart failure and to understand how best to preserve red blood cells, according to Dr. James Adelstein, a Harvard Medical School professor of medical biophysics. Much of the re-

search occurred in Boston, at Boston City Hospital and the former Peter Bent Brigham, which is now part of Brigham and Women's Hospital.

The difference between these studies and those at Fernald, Adelstein noted, is that the research directly benefited the patients or others with the same disorder.

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